General Physics
BRIDGING THE MAXWELL AND BOLTZMANN THEORIES FOR
LIGHT MIGRATION IN RANDOM MEDIA*

Matthew Narter, S. Menon*, Q. Su*, R. Grobe*
Intense Laser Physics Theory Unit
Department of Physics, Illinois State University, Normal, IL 61790-4560
http://www.phy.ilstu.edu/ILP

For system of randomly arranged plane-parallel dielectric layers with
randomly varying index of refraction and width, we compare the reflection
coefficient derived from the Maxwell equations with that of the Boltzmann
theory [1]. For a strictly monochromatic field this coefficient is an
oscillatory function of the laser frequency. We show how suitable frequency
or ensemble averaging permits a comparison of the two theories. The
calculation of the usual Boltzmann scattering coefficient from microscopic
parameters can be improved [2] to permit a better agreement with the exact
Maxwell data.

[1] Q. Su, M. Narter, S. Menon and R. Grobe, **J. Int. Soc. Opt. Eng.** (in
      press).
[2] S. Menon, Q. Su and R. Grobe, **Phys. Rev. E**, in press.